

REMARKS:

This application has been carefully studied and amended in view of the Office Action dated June 24, 2004. Reconsideration of that action is requested in view of the following.

The specification has been amended in view of the objection with respect to there being no antecedent basis for the spiral inhomogeneous cross-section being "symmetrical". A paragraph has been added to provide that antecedent basis. As pointed out in the prior amendment rectangular sections are by definition symmetrical in the sense that they appear identical on either side of at least one axis drawn through their center. Accordingly, the amendment to the specification does not involve new matter, but rather states what is inherent. Similarly, as pointed out in the prior amendment grooved circular cross sections could also be made symmetrical by, for example, evenly spacing the grooves about the circular perimeter.

Independent claims 27 and 28 have been amended to more clearly define the invention. Prior independent claims 29-30 have been replaced by dependent claims 31 and 32. In that regard, the features of prior independent claim 29 as regards the "hole" have been incorporated in claim 31 which is dependent on claim 27. Similarly, the features of prior independent claim 30 regarding the "hole" have been incorporated in claim 32 which is dependent on claim 28.

Claims 33-50 have been added to complete the claim coverage. Since there are now 22 total claims a supplemental fee of \$18.00 is required for the two claims in excess of twenty. The Commissioner is authorized to charge such fee to Deposit Account No. 03-2775.

Of the newly added claims 33-50, claim 33 is the only independent claim. Claim 33 is directed to a system rather than solely to the resonator. Claim 33 has similarities to claims which had been previously presented earlier in the prosecution. Accordingly, the addition of claim 33 should not present new issues which would require further search. Dependent claims 34-50 relate to various features, many of which had been previously presented in dependent claims while others find clear support in the specification, but were not specifically claimed. Since the dependent claims are all dependent directly or indirectly on claim 33, if claim 33 is found to be allowable then the addition of dependent claims 34-50 should not present new issues or require additional searching.

It is respectfully submitted that claims 27-28 and 31-32 are patentable over Boukhny. Parent claims 27 and 28 are similar to each other and differ in that claim 27 is directed to longitudinal vibration being initially produced while claim 28 is directed to torsional vibration being initially produced. Each of claims 27 and 28 also includes the feature of a portion of the resonator being of a symmetrical spiral inhomogeneous cross-section. As now amended each of claims 27 and 28 points out that this structure comprises means for converting the longitudinal (claim 27) or the torsional (claim 28) vibration into a combined longitudinal-torsional vibration.

The features of claims 27-28 and 31-32 clearly differ from Boukhny. Specifically, Boukhny expressly points out that the tip 12 may be “asymmetrically” shaped. (col. 4, line 9) See also col. 4, line 10 and claim 2.

Significantly, the purpose of the asymmetric shape of the tip 12 in Boukhny is to address the problem of the tip becoming loose. This is clearly stated in col. 4, lines 7-10 “The torsional motion of horn 16 may cause cutting tip 12 to loosen. In order to reduce

the chances of cutting tip 12 becoming loose, tip 12 may be asymmetrically shaped, as seen in FIGS. 4 and 5". Boukhny goes on to explain in col. 4, lines 10-14 that "This asymmetric shape can be accomplished by cutting spiral thread 13 in tip 12 to increase the hydrodynamic forces on tip 12 in the manner more fully described in U.S. Pat. No. 5,676,649..." [U.S. Pat. No. 5,676, 649 similarly refers to "a pair of asymmetric, hydrodynamic channels". (col. 4, line 25)] Accordingly, aside from the fact that the spiral thread in Boukhny creates an asymmetric shape (not the claimed symmetric shape of claims 27-28), that shape does not comprise means for converting a single type of vibration (longitudinal or torsional) into a combined longitudinal-torsional vibration. Indeed, this could not be so because Boukhny specifically provides separate crystals to accomplish the two types of motion. See col. 2, lines 52-54. "Crystals 18 are polarized to produce torsional motion. Crystals 20 are polarized to produce longitudinal motion." Accordingly, the means for producing the two types of motion in Boukhny are located in a portion different than the spiral thread 13. See, for example, Figure 1 of Boukhny.

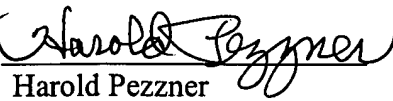
It is respectfully submitted that parent claim 33 and its dependent claims are also patentable over Boukhny. Parent claim 33 is directed to an ultrasonic longitudinal-torsional tissue dissection system which includes a transducer for receiving current and voltage from an ultrasonic generator. The transducer produces, at its point of contact with a resonator, a single type of vibration which would be either a longitudinal vibration or a torsional vibration. The resonator includes a portion having an inhomogeneous cross section to convert that single type of vibration into a combined longitudinal-torsional vibration which is imparted to the tip.

As discussed above Boukhny uses two distinct and separate crystals 18 and 20 for individually producing the torsional motion and the longitudinal motion. To the extent that Boukhny includes a tip having a spiral thread which results in an asymmetric shape, the function of that shape is “to reduce the chances of cutting tip 12 becoming loose”. (col. 4, lines 8-11) Moreover, since the crystals which are upstream from the tip 12 and from the horn 16 in Boukhny, have already produced the individual longitudinal and torsional motions Boukhny can not be reasonably interpreted as disclosing a inhomogeneous portion of a resonator being used to receive a single type of vibration and then convert it to the combined vibration defined in claim 33. It would also be repugnant to Boukhny (who clearly teaches the provision of separate motion producing structure and who clearly teaches the use of an asymmetrically shaped portion to reduce the chances of the tip becoming loose) for someone of ordinary skill in the art to modify Boukhny in the manner of claim 33 wherein there would be a transducer producing only one type of vibration and wherein an inhomogeneous cross section portion of a resonator converts that single type of vibration into the combined longitudinal-torsional vibration.

For the reasons given above it is respectfully submitted that the claims herein patentably define over Boukhny and this application should be passed to issue. If Examiner Sirmons has any suggestions for placing this application in condition for allowance, it is requested that he telephone either the undersigned attorney or applicant.

Respectfully submitted,

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